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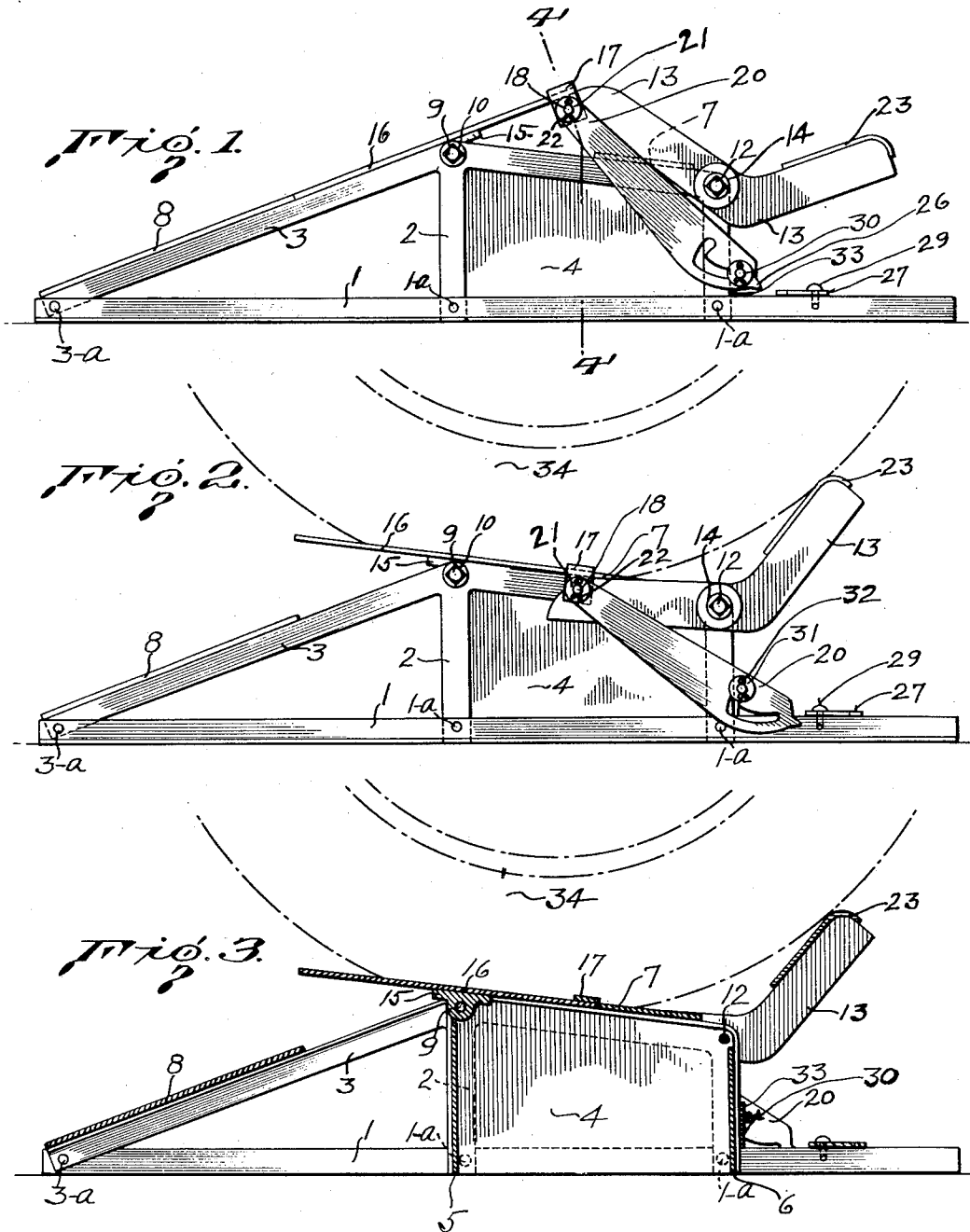
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LIFTING DEVICE

Filed July 21, 1931

2 Sheets-Sheet 1



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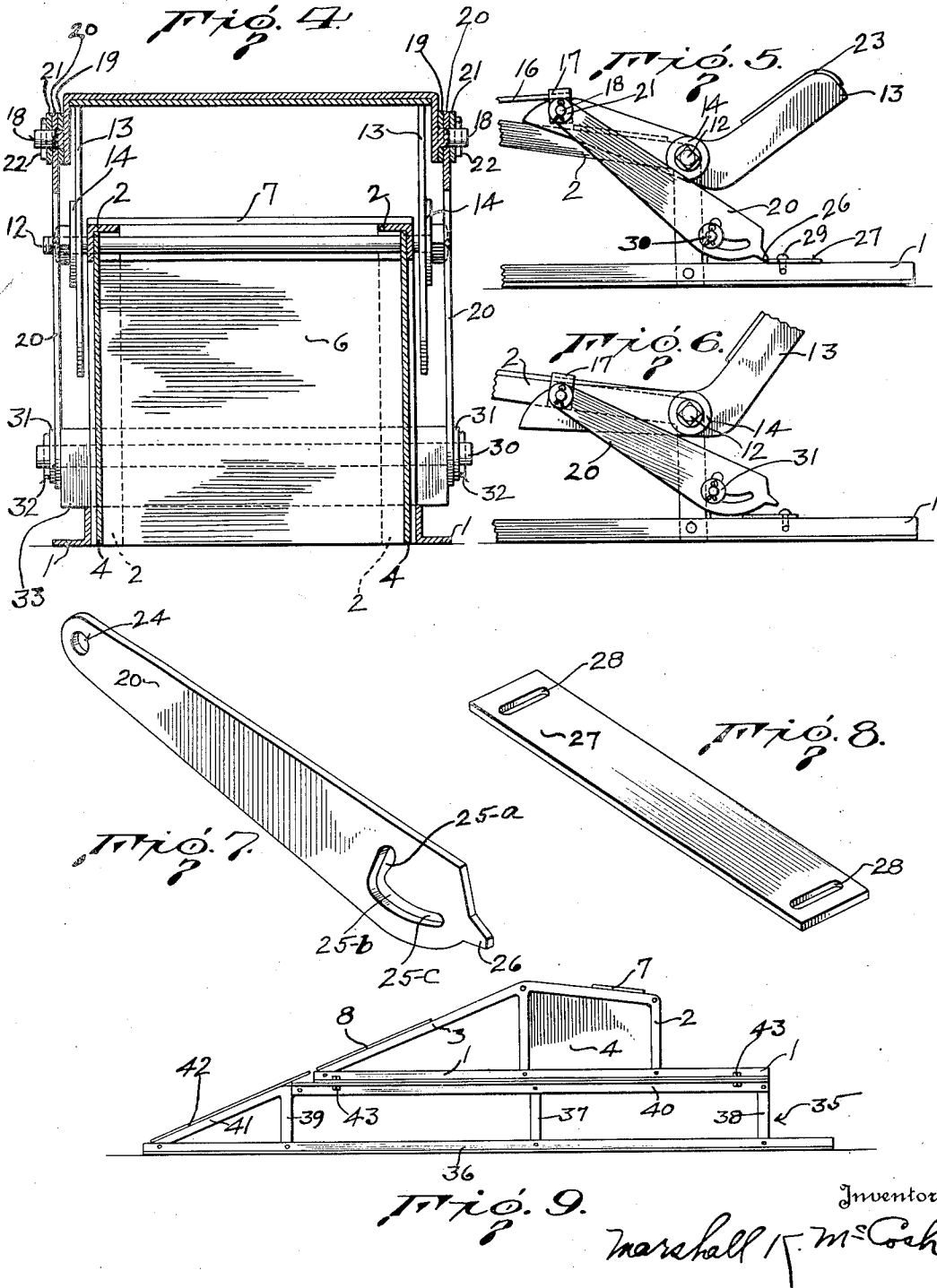
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1,922,553

LIFTING DEVICE

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Application July 21, 1931. Serial No. 552,281

8 Claims. (Cl. 254—88)

This invention relates to lifting devices and has special reference to vehicle jacks on which wheels of a vehicle are run to elevate said wheels and the portions of the vehicle associated therewith.

The objects and nature of the invention will be readily understood by those skilled in the art in the light of the following explanation and the accompanying drawings illustrating what now appears to me to be the preferred mechanical expression or embodiment of my invention from among other forms, constructions and arrangements within the spirit and scope thereof.

One object of the invention is to provide an improved movable stop and arrangement for actuating the said improved stop.

Another object is to provide a reenforcing arrangement for a movable stop against the strain put upon said stop by a vehicle wheel.

Another object is to provide an improved arrangement for locking a movable stop in its functioning position at the time it is to function as a stop.

Another object is to provide an improved arrangement for locking a movable runway in position when a vehicle wheel has moved upon it and it is desired that the runway be stable.

Another object is to provide an improved arrangement for unlocking both the movable stop and the movable runway.

The movable stop, the arrangement for actuating the movable stop, the arrangement for locking the movable stop in its functioning position, the arrangement for locking the movable runway, and the arrangement for unlocking both the movable stop and the movable runway is claimed in my application for Letters Patent filed April 23, 1931, Serial No. 532,342.

Another object of this invention is to provide a detachable auxiliary base for lifting devices of this general type to increase the distance said devices can raise a body.

Another object is to provide an improved construction for lifting devices of this general type.

With the above mentioned and other ends in view, my invention consists of certain novel features, arrangements and combinations as more fully and specifically set forth hereinafter, illustrated in the accompanying drawings, and particularly pointed out in the claims.

In the accompanying drawings—

Figure 1 is a side elevation of what seems to me now to be the preferred embodiment of my invention less the detachable auxiliary base.

It shows the disposition of the parts prior to a vehicle wheel being moved upon it.

Figure 2 is a side elevation thereof showing the disposition of the parts when a vehicle wheel has been moved the maximum distance upon it and the movable stop has been moved into its functioning position and the movable stop and the movable runway have been locked.

Figure 3 is a longitudinal section showing the parts disposed as in Figure 2.

Figure 4 is a section on the line 4—4 of Figure 1.

Figure 5 is a detail, side-elevation view showing the locking arrangement just as it is about to lock.

Figure 6 is a detail, side-elevation view showing the locking arrangement upon being unlocked by hand and set in the unlocked position preparatory to the vehicle wheel being moved off the device.

Figure 7 is a detail of the locking-arm, showing the shape of the locking-slot therein.

Figure 8 is a detail of slide-plate employed to set the locking arm in the unlocked position shown in Figure 6.

Figure 9 is a side elevation of the detachable auxiliary base. For the sake of simplicity only the bare body of the main lifting device is shown.

The frame of this embodiment of my invention is built of angle iron. Each of the two lower lengths of angle iron 1 of the main lifting device has riveted to it by rivets 1—a lengths of angle iron 2, which angle iron 2 is formed into the three-dimension shape shown. This forming is done by first shearing out a V from one of the legs of the angle iron, bending the other leg longitudinally until the edges of the V touch, and then welding the edges of the V together. Lengths of angle iron 3 are welded to formed angle irons 2 at their upper ends and riveted to angle irons 1 at their lower ends by rivets 3—a. The lower ends of angle irons 3 are at what I term the rear of the lifting device. To the inside of each of the formed angle irons 2 is fastened by welding at a few small areas, a steel sheet 4, which sheet 4 extends to the inside corners of the angle iron at all three sides, except in the corners of the bends, and as far down as the bottom of the angle iron 1. Steel sheets 4 are against one of the inside faces of the three dimensions of the formed angle irons 2, as shown in Figures 3 and 4, but do not touch angle irons 1. To the inside of the rear end of formed angle irons 2 is fastened steel sheet 5, and to the inside of the forward end, steel sheet 6, in a man-

ner similar to sheets 4, except that steel sheets 5 and 6 extend vertically only as far as shown in Figure 3. Formed angle irons 2 and steel sheets 4, 5 and 6 thus form a box-shape body open at the top and bottom and higher at the rear end than at the forward end. Across the top of this box-shape body extends steel plate 7 from outside edge to outside edge of formed angle irons 2 and welded thereto. At the rear end of angle irons 3 a steel plate 8 extends across the tops of the two said angle irons, from outside edge to outside edge, and is welded thereto. Formed angle irons 2, steel sheets 4, 5 and 6 and steel plate 7 thus form a rigid, strong box-shape body for supporting a vehicle wheel. Steel plate 8 adds rigidity and strength to the rear end of the device and, also, serves as one length of the wheel runway. Steel plate 7 serves, also, as one length of the wheel runway, which length 7 is needed in the case of small wheels, as small wheels move farther forward on the lifting device.

From one side to the other side of the box-shape body, at the upper rear corner, extends bolt 9, which bolt 9 is held in position lengthwise by a steel washer 10 and the head of the bolt on the outside of one of the two formed angle irons 2 and by a steel washer and nut (not shown) on the outside of the other formed angle iron 2. At the upper forward corner of the box-shape body is bolt 12 which extends through the two formed angle irons 2 and through the two side arms of movable stop 13 and extra-large-diameter washers 14, said bolt 12 having its head at its one end and a nut at its other end.

Bolt 9 extends through bearing 15, which bearing 15 is welded to the under side of movable runway 16 made of steel plate. Movable runway 16 pivots on bolt 9. Bolt 9 does not move: the bearing 15 turns on bolt 9. Bearing 15 is of a length $\frac{1}{8}$ inch less than the clearance between the insides of the angle irons 2: this keeps the movable runway 16 in position lengthwise of the bolt 9. Movable runway 16 is of the same width as steel plates 7 and 8. At the forward end of movable runway 16 is steel plate cross-piece 17 welded thereto, cross-piece 17 being bent downward at right angles at the edges of movable runway 16. In each of the two downwardly-bent ends of cross-piece 17 a short pin 18 is countersunk and welded. The inside of said bent ends are flat and smooth, the pins 18 extending outwardly through steel washers 19, locking-arm 20, and steel washers 21. At the ends of pins 18 are small holes in which cotter pins 22 are set. On the inside of each of the two downwardly-bent ends of cross-piece 17 is one end of the rearwardly-extending arm of movable stop 13.

Movable stop 13 moves in and out of its functioning position by pivoting on bolt 12. When the forward end of movable platform 16 moves upwardly from the position shown in Figures 2 and 3 the rear end of rearwardly-extending arms of movable stop 13 follow it by reason of the fact that they are lighter in weight than the forwardly-extending arms and the stop-plate 23 combined, or in other words, by reason of the fact that the part of the movable stop in the rear of bolt 12 is lighter than the part forward of bolt 12. The rear end of each of the two said arms is curved, the curve extending in the rearward direction. Such a curved end is a part of this invention. Such a curved end gives a wider range of movement to the movable stop. In the embodiment here shown the range of movement of the rear ends of said arms is greater by a dis-

tance equal to the width of the arms than the range would be if the ends were straight lines at right angles to the direction of the length of said rearwardly-extending arms. A still greater movement could be had by widening the rear end of said rearwardly-extending arms in the downward direction, the rear tip of the arms being kept the same distance from bolt 12, the radius of curvature of the curve being then greater.

The arms of the movable stop are held securely in position in the direction of their thickness by the formed angle irons 2, extra-large-diameter washers 14, which washers 14 are held in position by the head and nut of bolt 12, by cross-piece 17 and by the downwardly-bent ends of cross-piece 17. This arrangement for securely holding the movable stop in sidewise position is a part of this invention. The strain put upon the movable stop by a vehicle wheel is severe and will sometimes distort the movable stop if it is not reenforced by these or similar means.

Stop-plate 23 is formed of a rectangular piece of steel plate and welded to the upper edges of the forwardly-extending arms of movable stop 13.

The shape of the two locking-arms 20 is shown in Figure 7. They are made of steel plate. A description of one of the two locking-arms is as follows: At its one end is the hole 24 for pin 18, and at its other end is locking-slot 25. The part of locking-slot designated in Figure 7 as 25-a is the locking part of the slot, and is wide enough to permit it to move freely with rod 30 in it. The two sides of this part of the slot 25-a are sections of circumferences having the center of hole 24 as their centers. When the uppermost part of the part of the slot 25-a rests on bolt 30 the lowermost part of the locking-arm 20 almost touches the horizontal leg of the angle iron 1. Another part of locking-slot 25, designated in Figure 7 as 25-b, is $\frac{3}{8}$ inch wider than the diameter of rod 30; while another part, designated as 25-c, is only wide enough to permit it to move freely with rod 30 in it. The locking-slot would operate the same way if it was the same width at 25-c as at 25-b. The reason I have not made the slot wider at 25-c has been to leave as much of the metal as practicable for the sake of the strength of the locking-arm 20. Tip 26 of locking-arm 20 projects at the extreme end of the locking-slot end of said locking-arm 20. The edge lines of the locking-arm approaching tip 26 can be more gradual than shown in these drawings. The tip need not be so narrow as shown back from the extreme end of the tip.

Detail of slide-plate 27 is shown in Figure 8. It is made of steel plate. At each of its ends is a slot 28 which slides on steel rivet 29. The heads of said rivets 29 hold slide-plate 27 down on the upper edges of angle irons 1; the other ends of rivets 29 are welded to the inside side of angle irons 1.

Rod 30 is a steel rod extending the width of the box-shape body, through the two locking-arms 20, and through steel washers 31. At each end of rod 30 is a small hole in which cotter pin 32 is set. Rod 30 is welded to the forward side of rectangular steel strip 33, which strip 33 lies flat against formed angle irons 2 and is welded thereto. Locking-arms 20 are held snugly against the ends of strip 33 by the washers 31 and cotter pins 32.

The detachable auxiliary base 35 is shown in side elevation in Figure 9. It is constructed of lengths of angle iron. Length 36 rests on the floor or ground. To length 36 are riveted upright

lengths 37, 38 and 39. At the tops of lengths 37, 38 and 39 is riveted length 40. Length 41 is riveted to the rear end of length 36 and welded to the top of length 39 and extends an inch farther in a horizontal direction to permit of length 40 being riveted to it. The other side of this detachable auxiliary base 35 is a duplicate of the side just described. The two sides are joined by two lengths (not shown), one length connecting the lower ends of lengths 37, to which it is riveted; and the other connecting the lower ends of lengths 38, to which it is riveted. The rear ends of the two sides of detachable auxiliary base 35 are joined by steel plate 42, laid on the upper faces of lengths 41 and welded thereto. Steel plate 42 serves, also, as a length of runway for a vehicle wheel. There are bolt holes in the lengths 40 for bolting the main lifting device thereon by bolts 43. Plate 42 forms a continuation of runway 8 of the main lifting device when the main lifting device is positioned on top of the detachable auxiliary base, as shown in Figure 9.

This embodiment of my invention is used in the following described manner.—

When the main lifting device is used without the detachable auxiliary base 35, and with the parts disposed as shown in Figure 1, the main lifting device is positioned in line with a vehicle wheel, either in front of or behind the wheel, the lower (rear) end of steel plate 8 touching the tire of the wheel at or near the ground or floor. The vehicle is then moved, under its own power or by other means, to run the wheel on and up steel plate 8 and movable runway 16 until the forward end of movable runway 16 tilts to the position shown in Figure 2 and the wheel 34 is in contact with stop-plate 23 of movable stop 13. When the forward end of movable runway 16 tilts it pushes the rearwardly-extending arms of movable stop 13 downward. When the rearwardly-extending arms are pushed downward, the forwardly-extending arms move upward, pivoting on bolt 12. At the same time locking-arm 20 is pushed downwardly and forwardly from its connection with cross-piece 17; during this movement the upper edge of part 25—c slides over the top of rod 30, then part 25—b slides over said rod 30, and when movable runway 16 reaches the position in which it is shown in Figure 2 the 25—a part of the locking-slot is over rod 30 and that end of the locking-arm 20 drops until the top of 25—a part of the locking-slot comes in contact with bolt 30, securely locking the locking-arm 20 and, consequently, movable runway 16 and movable stop 13. The wheel 34 is now held securely in position on top of the lifting device: movable stop 13 preventing movement of the wheel forwardly of the lifting device, and the inclined of movable runway 16 preventing movement of the wheel rearwardly of the lifting device. Two of these lifting devices are usually used at a time, one for each of the two rear wheels of a vehicle, or one for each of the front wheels. Four of the devices are sometimes used at a time, one for each of the four wheels of a vehicle. The devices are used in order to give more room for a workman beneath a vehicle. In the case of an automobile this increased room is convenient and sometimes necessary for work done by a workman under the automobile, such as draining the engine oil, changing the differential oil, the transmission oil, oil for the universals, greasing, repairs, etc. Being under the wheels, the devices

do not interfere with the movement of a workman beneath a car.

Any wheel that has been moved to the top of one of these devices can be lifted higher by a jack of some other type placed on a block under, say, the axle connected with that wheel, for changing the tire, adjusting the brakes or some other purpose.

To lower the wheel to the ground or floor, the locking-arms 20 are first unlocked. They are unlocked by hand. First one locking-arm is pulled upwardly at its lower end until the bottom of rod 30 comes in contact with the bottom of the locking slot at the bottom of part 25—a. Then slide-plate 27 is pushed rearwardly along the top of angle iron 1 on that side of the lifting device and under the tip 26 of locking-arm 20 just far enough to hold it up. Then the other locking-arm is lifted up and the slide-plate pushed under it. Then the slide-plate is pushed as much farther as it will go along the tops of angle iron 1 and under locking-arms 20. The slide-plate 27 then holds locking arm 20 in the unlocked position shown in Figure 6. The vehicle is then moved so that the wheel moves rearwardly of the lifting device. As the wheel passes over a point above bolt 9 the movable runway 16 tilts until it rests on angle irons 3 as shown in Figure 1. The locking-arm 20 is pulled by cross-piece 17 to the position shown in Figure 1; and the movable stop 13 moves by the force of gravity to the position shown in Figure 1 by reason of the fact that its forward end is heavier than its other end. The movable stop is thus kept from striking or being struck by parts of the vehicle except the wheel.

While slide-plate 27 may be moved forwardly of the lifting device by hand, it need not be; and if it is not moved forwardly by hand or in some other manner, the tips 26 of the locking-arms will move it forwardly and permit the locking-arms to lock when the forward end of movable runway tilts forwardly and downwardly to the position shown in Figure 2. Parts 25—b of the locking-slots being wider than the diameter of bolt 30, gives the up-and-down play that permits slide-plate 27 to be pushed under tips 26 by hand and yet permit said tips 26 to drop lower than slide-plate 27 when said tips 26 are not held up. When the tips 26 are held up by slide-plate 27 in the position shown in Figure 6 the bottom of rod 30 is in contact with the bottoms of parts 25—b of the locking-slots; and when said tips 26 are not held up the tops of parts 25—b rest on the top of rod 30. When the tips of parts 25—b rest on the top of rod 30 the tips 26 are low enough to reach a little distance under the rear edge of slide-plate 27.

In Figure 5 the forward end of movable runway 16 is shown as having almost completed its downward tilting movement, tips 26 as having pushed slide-plate 27 forwardly almost all the way, and part 25—a of locking-arm 20 almost over rod 30. When the movable runway 16 has tilted downwardly until it rests on the top of formed angle irons 2 the parts will be in the positions shown in Figure 2. Thus tips 26 push slide-plate 27 forwardly out of their way so that locking-arms 20 are free to drop on rod 30 and lock when the parts 25—a of the locking-slots cove over said rod 30.

When it is desired to raise the wheel higher than it would be raised by the main lifting device alone, the main lifting device is positioned on top of the detachable auxiliary base and fastened thereto by short bolts 43. The heightened lifting

device is then ready for use, and is used in the same way as the main lifting device alone is used, except that as the heightened lifting device may be too high to position in front of a rear wheel of a vehicle, or behind the front wheel of a vehicle, it may be necessary to position it at the rear of a rear wheel or in front of a front wheel of a vehicle.

It is evident that the various members and parts of this embodiment of my invention can be constructed of materials other than shown in the accompanying drawings and described herein, and, also, that the designs and arrangements can be altered considerably without departing from my invention.

I claim:

1. In a lifting device, a support, a fixed runway leading part way to the top of said support, a pivoted runway associated with the fixed runway and leading to the top of said support, and a stop attached to said support and moved by said pivoted runway.

2. In a lifting device, a support, a fixed runway leading partway to the top of said support, a pivoted runway associated with the fixed runway and leading to the top of said support, and a stop attached to said support and moved by said pivoted runway, said stop comprising an arm with a curved end for increasing the range of movement of said stop.

3. In a lifting device, two horizontal ground members, uprights fastened to each of said ground members and connected at their upper ends by members to form two vertical quadrilaterals having the upper sides sloping forwardly and downwardly, members extending from the rear end of each of said ground members to the top of the rear end of said upper side of each of the vertical quadrilaterals, steel plates connecting the two vertical quadrilaterals to form a box-shape structure and also connecting the members which extend from the rear end of each of said ground members to the top of the rear end of said upper side of the vertical quadrilaterals to form a runway.

4. In a lifting device, two horizontal ground members, uprights fastened to each of said ground members and connected at their upper ends by members to form two vertical quadrilaterals having the upper sides sloping forwardly and downwardly, members extending from the rear end of each of said ground members to the top of the rear end of said upper side of each of the vertical quadrilaterals, steel plates connecting the two vertical quadrilaterals to form a box-

shape structure and also connecting the members which extend from the rear end of each of said ground members to the top of the rear end of said upper side of the vertical quadrilaterals to form a runway, and a runway pivotally attached to the rear end of the top of said box-shape structure.

5. In a lifting device, two horizontal ground members, uprights fastened to each of said ground members and connected at their upper ends by members to form two vertical quadrilaterals having the upper sides sloping forwardly and downwardly, members extending from the rear end of each of said ground members to the top of the rear end of said upper side of each of the vertical quadrilaterals, steel plates connecting the two vertical quadrilaterals to form a box-shape structure and also connecting the members which extend from the rear end of each of said ground members to the top of the rear end of said upper side of the vertical quadrilaterals to form a runway, a runway pivotally attached to the rear end of the top of said box-shape structure, and a stop pivotally attached to the forward end of the top of said box-shape structure.

6. A lifting device comprising a body, a pivoted runway associated with said body, a stop-plate movably mounted on said body and actuated by said runway, a movable locking-arm associated with said device and actuated by said runway means which lock said locking-arm when the forward end of said runway moves downward actuating said locking-arm, whereby the runway and stop-plate are locked, the said downward movement of the forward end of said runway moving the stop-plate upward.

7. A lifting device comprising a body, a pivoted runway associated with said body, a locking-arm movably associated with both the said runway and the said body and actuated by the said runway, and means whereby the said runway and the said body are locked together by the said locking-arm when the forward end of said runway moves downward actuating said locking-arm.

8. A lifting device comprising a body, an incline extending upwardly and forwardly to the top of said body, a stop-plate movably mounted rearward of said body, a locking-arm movably associated with said device, and means movably associated with said device and actuating said stop-plate and said locking-arm whereby, when said means are moved downward, the said stop-plate is moved upward and locked to the said body by the said locking-arm.

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